Stormwater Assessment Work Plan

Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon
(DEQ ECSI No. 5761)

Prepared for
Hampton Affiliates Inc.

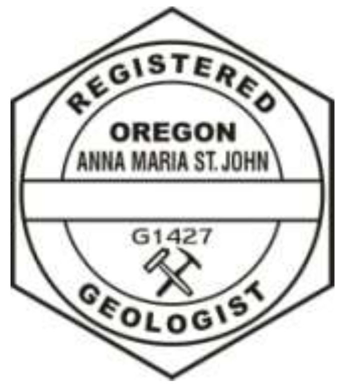
September 1, 2015

BRIDGEWATER GROUP, INC.

Stormwater Assessment Work Plan
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

The material and data in this report were prepared under the supervision and direction of the undersigned.

BRIDGEWATER GROUP, INC.



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SECTION 1 INTRODUCTION AND PURPOSE

On behalf of Hampton Affiliates Inc. (Hampton), Bridgewater Group (Bridgewater) has prepared this work plan for a stormwater assessment (SA) and source control measures (SCMs) at Hampton's Reload Yard at 4950 NW Front Avenue in Portland, Multnomah County, Oregon (the Site). Figure 1 shows the Site's location. This assessment is required by the October 26, 2012, Letter Agreement between Hampton and the Oregon Department of Environmental Quality (DEQ). A site tour with the DEQ was conducted on October 24, 2012. On the basis of the Letter Agreement and the site tour, Bridgewater prepared and submitted a work plan on December 28, 2012. The DEQ provided comments on the work plan on March 20, 2013. The work plan was revised again in May 2013 to address the DEQ's March 2013 comments. Hampton received draft comments on the May 2013 version of the work plan from the DEQ in August 2014. This version of the work plan addresses the DEQ's August 2014 comments. This version also incorporates comments from a meeting with the DEQ on August 10, 2015.

1.1 Objective

The objective of the SA is to determine whether hazardous substances are present at the Hampton site at concentrations that may pose an unacceptable risk through transport of these materials to the Willamette River with stormwater runoff.

1.2 Background

The DEQ is requiring this SA to ensure that the facility is not contributing to releases of hazardous substances to the Portland Harbor Superfund Site via City of Portland (City) or private stormwater utilities that discharge to the Willamette River.

SECTION 2 SITE DESCRIPTION AND HISTORY

This section describes the Site and vicinity, current and historical operations, potential current and historical contaminant sources, and stormwater drainage at and near the Site.

2.1 Site Location and Setting

Figure 1 shows the Site location and surrounding properties. The Hampton Reload Yard is located on 15.33 acres at 4950 NW Front Avenue in Portland, Multnomah County, Oregon. The Site is located in Section 19, Township 1 North, Range 1 East of the Willamette Meridian. The Site includes Lot 3 of Partition Plat No. 1994-41 located east of NW Front Avenue. The Site is located adjacent to the west bank of the lower Willamette River and is immediately downstream of City outfall 19 (OF-19) (see Figure 2). The Site is bounded on the south by NW Front Avenue, to the southeast by Shaver Transportation, to the northwest by the Cal Portland plant, and to the southwest by the Tube Forgings of America facility.

The Site includes an office trailer, warehouse/storage building, and paved storage areas. The site is paved or covered by buildings, except the bank adjacent to the Willamette River. A dock is present along the shoreline. It is leased to Global Marine Transportation Inc. for moorage by the property owner, Front Avenue II LLC.

The Site and vicinity are zoned heavy industrial (IH) with a River Industrial (i) overlay that encourages and promotes the development of river-dependent and rive-related industries. The IH zone is one of the three zones that implement the Industrial Sanctuary map designation of the City's Comprehensive Plan. The zone provides areas where all kinds of industries may locate including those not permitted in other zones and includes specific development standards to assure safe, functional, efficient, and environmentally sound industrial development.

The Site and vicinity are part of the Guild's Lake Industrial Sanctuary. The Guild's Lake Industrial Sanctuary Plan district fosters the preservation and growth of this premier industrial area adjacent to Portland's central city. The district's large number of well-established, industrial firms are dependent on the area's multimodal transportation system, including marine, rail, and trucking facilities, and on the ability of area streets to accommodate truck movements. The provisions of the plan recognize that the displacement of industrial uses by inappropriate non-industrial uses potentially threatens the integrity of this district and investments in public and private infrastructure. The provisions protect the area from incompatible uses which threaten the district's integrity, stability and vitality and compromise its transportation system.

2.2 Current and Historical Uses

Hampton had no connection with the site until September 14, 1994, when CMI Northwest (formerly Hampton Lumber Sales) began leasing the property from Front Avenue II Ltd, the property owner. Before CMI Northwest leased the site, Tricon Forest Products, Inc. (Tricon), leased the parcel, from 1988 to about 1993. Before 1988, the parcel was undeveloped.

Since 1994, Hampton has used the site for storage and reloading of lumber and other building products used in the United States. Honsador Lumber loaded lumber onto trucks in the northwest part of the property from May 29, 2003 until 2013. Lumber and building products are brought in by truck and reloaded onto railroad cars or other trucks for shipment. These lumber and building products are stored in the paved storage areas around the Site. Most, but not all, of the lumber is wrapped in plastic. Some of the lumber is resorted and repackaged in the storage building. Some of the lumber units are cut down into smaller units inside the storage building and are then resorted into new lumber units inside the storage building. Wastes generated include the following: Sawdust, wood, plastic banding, plastic lumber wrap, used oil, used antifreeze, and used fluorescent light tubes. Wastes are stored in covered bins around the property or in drums inside concrete secondary containment in the storage building.

The site is occupied by an estimated 48,500-square-foot wood-framed, sheet-metal storage building with a painted metal roof and a 5,848-square-foot office trailer on concrete slabs (see Figure 2). The entire site is paved with asphalt and access to the property is restricted by fencing. A dock is present along the river and is used for moorage by Global Marine Transportation, Inc. A 6,000-gallon, double-walled, diesel aboveground storage tank (AST) is located in the northwest corner of the property. It is not covered. Two propane ASTs are located near the diesel AST and are used for fueling forklifts. Hampton also purchases and stores 55-gallon drums and 5-gallon-buckets of antifreeze, oils, and hydraulic fluid in concrete secondary containment in the storage building. The antifreeze is used for maintenance of forklifts and trucks. The oils and hydraulic fluid are used in the forklifts and the bar oil is used in chainsaws. Product is dispensed from 55-gallon drums in the storage building. Used oil is properly disposed of offsite. Hampton contracts for forklift maintenance once a month; a contractor comes to the site to service the machinery inside the storage building. All waste produced from vehicle maintenance is taken off site by the maintenance contractor. Two pole-mounted transformers are located in the northwest part of the Site (see Figure 2).

The following historical use and site development information is taken from Section 2.4 of the 2002 *Preliminary Assessment* (PA) Report (Maul Foster & Alongi, Inc. [MFA], 2002). In the early 1900s, the property appears to have included the land in the west part of the site. The east part of the site was created by fill material in the mid-late 1900s as shown on Figure 4 of the PA. Aerial photographs from 1936, 1939, and 1940 do not indicate the presence of any structures on the site. According to Dames & Moore, some filling with slag by Oregon Steel Mills, which operated on the property immediately northwest of the site, took place between 1941 and 1948 to extend the site riverward (Dames & Moore, 1977). A 1950 aerial photograph shows no active filling on the property. Figure 4 of the PA indicates that a large volume of fill was placed on the property between the 1940s and 1970s. The source of the fill material was slag from Oregon Steel Mills' operations, dredged material from the Willamette River, and construction debris, based on field observations during a geotechnical evaluation in 1983 (FSI, 1983). Filling is apparent in 1966 and 1967 aerial photographs thus creating a large part of the eastern part of the Hampton site as well as the Cal Portland site to the northeast. The U.S. Army Corps of Engineers (ACOE) placed approximately 442,571 cubic yards (cy) of dredged material offshore of Oregon Steel Mills in June 1966, based on information from the dredge *Multnomah* from May 1966 through June 1966. An additional 194,200 cu yd was placed offshore of the by the dredge *Oregon* from September through December 1966, and 327,800 cy between July and August 1967. Aerial photographs from 1970 and 1971 suggest that fill was placed east of Oregon Steel Mills along the waterfront thus creating a large part of the eastern part of the Hampton site and the Cal Portland site to the northeast. Aerial photographs from 1979 and 1980 indicate the redistribution of material on the property; the shoreline appears to have been extended riverward based on a comparison of the 1980 and 1990 aerial photographs.

Based on the results of 1977 and 1983 geotechnical investigations of the property, fill consisting of dredge material (silt, silty sand, and sand), slag from the Oregon Steel Mills operations, and assorted construction debris consisting of concrete, brick, steel, and wood are present under the property (Dames & Moore, 1977; FSI, 1983). Fill consisting primarily of dredged materials (sand, silty sand, and silt) to 30 to 40 feet below ground surface (bgs) underlies the east half of the site (see Figure 3 of the PA). Construction debris was also observed to be locally interbedded with river dredge materials in the east part of site. Slag also forms a surface mantle along the riverbank.

2.3 Stormwater Conveyance System

Figure 2 shows the site's stormwater conveyance system. Based on a review of site development plans and site reconnaissance, stormwater from the site appears to discharge to the Willamette River through five private outfalls, W-257, W-265, W-378, WR-379, and an unnamed outfall adjacent to WR-379 along the eastern and southern riverbanks. Fourteen catch basins/inlet grates are present on the property. All of the catch basins/inlet grates have inserts to control suspended solids, except catch basin CB10 in Drainage Area 3 that discharges to Outfall W-265 and sample point SP3 (see Figure 2).[1] All of the catch basins are Lynch-style

[1] This catch basin does not have an insert because Hampton is not able to remove the grate.

catch basins and are three to four feet deep, except CB5 through CB8 in Drainage Areas 1 and 2 which are up to 10 feet deep and require confined space equipment and training to enter.

Four drainage areas have been delineated on the property based on stormwater runoff patterns and the topography of the property. Drainage Area 1 is 49 percent of the Site and drains paved storage areas and truck parking areas, and discharges to the Willamette River via private outfall WR-379 and an unnamed outfall near WR-379 on the southwest bank of the Site. Drainage Area 2 is 12 percent of the Site and drains paved storage areas and discharges to the Willamette River via private outfall on WR-378 on the southeast bank of the Site. Drainage Area 3 is 19 percent of the Site and receives runoff from paved storage areas around in the central part of the Site and discharges to the Willamette River via private outfall WR-265. Drainage Area 4 is 20 percent of the Site and receives runoff from the storage building's roof drains and paved areas around the storage building and discharges to the Willamette River via private outfall WR-257.

The site discharges stormwater runoff to an Area of Potential Concern (AOPC 18[2]) in sediment in part of the Willamette River in the Portland Harbor Superfund Site.

[2] The U.S. Environmental Protection Agency recently redefined the AOPCs as sediment management areas (SMAs); the sizes of the SMAs are a function of the proposed remedial action levels (RALs). The lower the RAL, the larger the SMA.

SECTION 3 REGULATORY HISTORY

Based on site operations, the Hampton property is not considered a environmentally regulated site. The facility is not registered with the U.S. Environmental Protection Agency (USEPA) as a generator of hazardous waste. The site does not require a stormwater permit. Operations do not generate air emissions that are regulated. No USTs or LUSTs were listed for the facility in the DEQ's databases. The site was developed in 1988 and no USTs were shown on the site development plans. The facility does not generate any process wastewater. Wastes generated include the following sawdust, wood, plastic banding, plastic lumber wrap, used oil, used antifreeze, and used fluorescent light tubes. No violations of environmental regulations have been documented.

SECTION 4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND CLEANUPS

This section provides a summary of previous environmental investigations.

Geotechnical investigations were performed on this parcel in the late 1970s and early 1980s for potential warehouse development by Oregon Steel Mills (Gilmore Steel) in this parcel (Dames & Moore 1977, 1982; FSI, 1983). Several test pits and borings were advanced to assess subsurface materials. Along the riverfront, subsurface materials generally consist of dredge material (silt, silty sand, sand) from the Willamette River to 30 to 40 feet bgs. Dredge material is underlain by Recent alluvium consisting of silt, silty sand, and sand below 40 to 70 feet, depending on the location of the boring. Slag was encountered only at the ground surface in some test pits and borings in the south part of the parcel. No other investigations have been performed on this parcel.

In June 2004, a groundwater investigation was performed along the bank of the Willamette River at the Hampton site and the Cal Portland site to the northwest to assess the quality of groundwater possibly discharging to the Willamette River (MFA, 2004). The DEQ requested this investigation in a May 20, 2003, letter to Front Avenue LP (the owner of the property on which Hampton operates) (DEQ, 2003). The DEQ was concerned that slag used as fill on the properties could be leaching metals to surface water in the Willamette River. Three borings were advanced on the Hampton property. Slag was not observed in any of these borings (see Drawing 2 of MFA, 2004). Detected total and dissolved concentrations of metals (barium, beryllium, chromium, copper, cobalt, iron, lead, manganese, nickel, silver, and zinc) were screened against the USEPA-DEQ Joint Source Control Strategy (JSCS) screening level values (SLVs) for groundwater or stormwater discharging to the Portland Harbor, where available. Arsenic, cadmium, silver and zinc were not detected and the method reporting limits (MRLs) were less than the SLVs, except for arsenic (20 micrograms per liter [ug/L] versus 0.045 ug/L). The MRL for total and dissolved cadmium was 1 ug/L which is almost equal to the SLV of 0.094 ug/L. Only one dissolved zinc concentration in a boring on the Cal Portland property near the boundary with the Hampton site slightly exceeded the SLV (39 ug/L versus 36 ug/L). Detected concentrations of total chromium and silver did not exceed the SLVs. Total manganese concentrations ranged from 150 ug/L to 7,350 ug/L; all concentrations exceeded the 2013 Lower Willamette Group's Portland Harbor Baseline Ecological Risk Assessment (BERA) Tier II secondary chronic value of 120 ug/L and Windward Environmental LLC's November 2014 hardness-based manganese preliminary remediation goal (PRG) or final chronic value of 1,128 ug/L. Note that concentrations at the point where aquatic biota may be exposed to the metal (i.e., transition zone water or pore water in sediment that is composed of some percentage of both groundwater and surface water) are expected to be substantially reduced relative to concentrations in groundwater due to natural attenuation processes and mixing with surface water.

SECTION 5 STORMWATER POLLUTION PREVENTION AND CONTROL MEASURES

As discussed in Section 3, the Hampton site is not required to have a stormwater permit on the basis of its operations, but currently voluntarily implements the following best management practices to minimize the impact of Site operations on stormwater runoff: The cleanout of solids from the stormwater system from March 7 through 9 of 2012; monthly vacuum sweeping of paved areas of the site; and the installation of liners to reduce suspended solids in all but one of the 14 catch basins and the regular inspection and replacement of the liners as needed.

SECTION 6 STORMWATER SYSTEM EVALUATION PLAN

6.1 Stormwater Line Solids Sampling and Analysis

The storm lines were cleaned in March 2012 because visual observations suggested that the stormwater system required maintenance. Hampton did not request characterization of the solids because of process knowledge about site operations during their generation. The cleanout solids consisted of sand/dirt, sawdust, and plastic. Hampton does not have any records regarding cleanouts of the storm lines since they began leasing the property in 1994.

Hampton proposes to inspect the catch basins to determine if the volume of solids is sufficient for sampling and analyses (i.e., at least 24 ounces for all of the DEQ-required analyses). Sampling protocols will be consistent with the City's 2003 *Standard Operating Procedures: Guidance for Sampling of Catch Basin Solids*.

If solids are present, a sample will be collected from each catch basin. Each sample will be collected using a decontaminated, stainless-steel (SS) trowel, spoon, scoop, or similar manual tools, placed in a decontaminated SS bowl, homogenized, and transferred to clean, new sample containers provided by the analytical laboratory.

Sampling equipment will be cleaned and decontaminated, and new gloves donned prior to collecting samples. Samples will be described in a field notebook for such attributes as grain size, composition, and color. Sample locations will be identified in the field and recorded in field notebook and on a field map. The depth of solids will be recorded as well as the dimensions of the catch basins will be recorded. If the depth of solids is greater than one-third of the distance between the bottom of the catch basin and the water line, the solids will be removed.

Sampling equipment will be decontaminated with a three-step wash between each sample. The wash will consist of:

- Nonphosphatic detergent (such as Alconox) and water wash
- Tap water rinse
- Deionized water rinse

Samples will be labeled in the field with location, date, and time. Samples will be placed on ice in a cooler and a completed chain-of-custody (COC) form.

One equipment rinseate blank will be collected between sampling locations for quality assurance/quality control (QA/QC) purposes; the equipment rinseate blank will be collected by pouring laboratory-supplied deionized water over clean, decontaminated sampling equipment and collecting the rinseate in laboratory-supplied sample containers and analyzed for those metals and organics listed below.

6.2 Stormwater Solids Analytical Suite

Site operations primarily include truck traffic and materials storage. Chemicals that may be present in stormwater include: Petroleum-related constituents (polycyclic aromatic hydrocarbons [PAHs] in fuel and oils in trucks and other vehicles, metals (tire and brake wear), and phthalates (possibly in the plastic packaging on lumber).

The USEPA has identified an area of potential concern in sediment (AOPC 18) near Willamette River mile 8.3 in the Portland Harbor Superfund Site adjacent to part of the site, on the basis of elevated concentrations of polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), pesticides, and other analytes causing benthic toxicity (e.g., metals) in river sediment.

Hampton proposes to composite the catch basin solids samples by drainage area and analyze them for potential site-related chemicals and chemicals of potential interest (COPI) in sediment in AOPC 18, including PCBs by USEPA Method 8082; PAHs by USEPA Method SIM PAH; semivolatile organic compounds (SVOCs) (hexachlorobenzene) by USEPA Method 8270D; metals (arsenic, cadmium, chromium, copper, manganese, mercury, silver, and zinc) by USEPA Methods 6010A, 6020A and 7471B; organochlorine pesticides (e.g., dieldrin and endrin) by USEPA Method 8081; total organic carbon by Standard Method 9056; and grain size by ASTM D422 as specified in Table 1.[3] Method reporting limits will be consistent with the DEQ-USEPA Joint Source Control Strategy (JSCS) SLVs, where possible. If enough solids are not present in a drainage area for analysis, samples may be composited by drainage area (e.g., solids from Drainage Areas 1 and 2 or 3 and 4 may be consolidated because these areas discharge to similar locations in the river, see Figure 2).

6.2 Stormwater Sampling Locations

Four drainage areas are present on the Site. Five outfalls to the Willamette River are present at the Site. Three of these outfalls are not safely accessible from the top of the river bank because of the steepness of the bank and abundant vegetation (e.g., blackberries), but catch basins that drain to these outfalls are accessible. Hampton proposes to collect stormwater samples from outfalls WR-257 and WR-265 as well as catch basin CB6 # in Drainage Area 1; this drainage area has the largest

[3] See *Risk Management Recommendations* report (Kennedy/Jenks Consultants and Windward Environmental LLC, 2011) and Appendix F of the 2013 *Portland Harbor RI/FS Remedial Investigation Report* (Integral Consulting Inc., Windward Environmental LLC, Kennedy/Jenks Consultants, and Anchor QEA, LLC. 2013). Note that while aluminum, barium, iron and chloroethane are also considered potential contaminants of interest for sediment in AOPC 18, JSCS SLVs have not been established for stormwater sediment.

amount of truck traffic and materials storage and CB6 receives runoff from all but one catch basin in this drainage area. No sampling is proposed in Drainage Area 2 because operations and runoff are similar to those in Drainage Area 1, but with less traffic. Figure 2 shows proposed sample locations. A sample, SP-1, will be collected from CB6 in Drainage Area 1. Sample location SP-2 is at outfall WR-265 which receives runoff from Drainage Area 3. Sample location SP-3 is at outfall WR-257 which receives runoff from Drainage Area 4. During sampling, Hampton will inspect the backs of the river to determine if any runoff is flowing from paved areas onto the banks of the river and discharging to the river.

6.3 Stormwater Sampling Schedule

Stormwater sampling will include at least four separate storm events (see Table 2).

- At least two of the four sampling events will represent "first flush" conditions. First flush is defined to mean within the first 30 minutes of stormwater discharge. The initiation of flow at the sampling location will be observed to verify first flush samples because the initiation of flow at this location does not usually line up with initiation of rainfall recorded at the nearest rain gage (City HYDRA rainfall gauge 121 at Northwest Yeon Avenue).
- All other samples will be collected within the first three hours of stormwater discharge.

Sampling events will be scheduled when it is predicted that the following storm event criteria will be met:
- Antecedent dry period of at least 24 hours (as defined by <0.1" over the previous 24 hours);
- Minimum predicted rainfall volume of >0.2" per event; and
- Expected duration of storm event of at least 3 hours.

Hampton will initiate stormwater sampling in the fall of 2015 with the goal of completion of sampling during the winter and spring of 2015-2016.

6.4 Stormwater Sampling Methods

After sample locations are approved by the DEQ, grab samples will be collected consistent with Washington State Department of Ecology guidance for stormwater grab sample collection and documentation procedures (Ecology, 2002). Samples will be collected directly into laboratory-supplied containers or using a decontaminated glass beaker. For locations inside manholes or catch basins, the container or glass beaker will be attached to a telescoping pole. The container or beaker will be lowered into the middle of the water column in the pipes.

Field parameters including temperature, pH, specific conductance, and turbidity will be measured at the time of the sample collection. In addition, the time of flow into the stormwater system will be noted and the flow rate will be measured at the start of flow in the stormwater system at each sample location and at the time of sample collection using an Isco 750 Area Velocity Module or similar instrument.

Samples will be labeled in the field with location, date, and time. Samples will be placed on ice in a cooler and a completed chain of custody form (COC).

Sampling equipment will be decontaminated with a three-step wash between each sample. The wash will consist of:

- Nonphosphatic detergent (such as Alconox) and water wash
- Tap water rinse
- Deionized water rinse

One equipment rinseate blank will be collected between sampling locations for quality assurance/quality control (QA/QC) purposes; the equipment rinseate blank will be collected by pouring laboratory-supplied deionized water over clean, decontaminated sampling equipment and collecting the rinseate in a laboratory-supplied sample containers and analyzed for those metals and organics listed below.

In addition, one field duplicate will be collected from one location during each sampling event by decanting water into two sets of bottles for the analytes listed below.

6.5 Stormwater Analytical Suite

Site operations primarily include truck traffic and materials storage. Chemicals that may be present in stormwater include: petroleum-related constituents (PAHs in fuel and oils in trucks and other vehicles), metals (tire and brake wear), and phthalates (possibly in plastic packaging on lumber). In addition, the following potential contaminants of interest (PCOIs) were identified for City outfall 19: polychlorinated biphenyls (PCBs), PAHs, phthalates, and metals (chromium, copper, lead, nickel, zinc) (Groundwater Solutions Inc., 2006 and City, 2010). As noted in Section 6.2, the USEPA has identified an area of potential concern in sediment (AOPC 18) near Willamette River Mile 8.3 in the vicinity of Outfall 19, based on elevated concentrations of PCBs, pesticides, and other analytes causing benthic toxicity (e.g., metals) in river sediment (see Section 6.2 and footnote 2).

Based on the types of chemicals that may be present in stormwater runoff at the Site, Hampton proposes to analyze stormwater samples for the following constituents: PCB aroclors by USEPA Method 8082; total and dissolved metals (aluminum, arsenic, cadmium, chromium, copper, manganese, mercury, silver, and zinc), by USEPA Methods 6010/6020/7470/7471; PAHs, by USEPA Method 8270 SIM; phthalates and halogenated semivolatile organic compounds (e.g., hexachlorobenzene) by USEPA Method 8270; and total suspended solids (TSS) (see Tables 2 and 3). Method reporting limits will be consistent with the DEQ-USEPA JSCS SLVs, where possible. Detection limits will be less than the DEQ SLVs for individual PCB Aroclors, except the bioaccumulation SLV for total PCBs (0.00064 micrograms per milliliter), which is too low to be quantified by analytical laboratories. Analyses will be performed on whole water samples, except for dissolved metals samples which will be field-filtered before transfer to laboratory-supplied bottles.

6.6 Data Quality Assurance and Control

All analytical results will be evaluated according to applicable parts of USEPA procedures (USEPA, 2008 and 2010) and appropriate laboratory and USEPA method-specific guidelines (USEPA, 1986).

The analytical laboratory will follow standard QA protocols during analysis of solids samples according to the laboratory's QA Manual including sample containers, preservatives, and holding times; quality control and calibration procedures; and data management.

Target acceptance criteria will be in accordance with the Contract Laboratory Program (CLP) National Functional Guidelines or analytical lab guidelines. Procedures for verification and validation of laboratory data and field QC samples will be completed as described in the CLP EPA guidance documents.

QA objectives for solids analytical data are usually expressed in terms of bias and precision. The solids and stormwater data will be evaluated using the parameters discussed below.

Bias. A matrix spike is prepared by adding a known amount of a pure compound to the environmental sample. A blank spike is prepared by adding a known amount of a pure compound to a laboratory-prepared blank sample. The spikes check for analytical interferences. The calculated percent recovery of the spike is taken as a measure of the bias of the total analytical method. When there is no change in volume due to the spike, percent recovery is calculated as follows:

$$PR = \frac{(O - X) \times 100}{T}$$

Where:

PR = percent recovery

O = measured value of analyte concentration after addition of spike

X = measured value of analyte concentration in the sample before the spike is added

T = value of the spike

Tolerance limits for the acceptable percent recovery of matrix spikes and blank spikes are established by the lab in accordance with CLP Guidelines.

Precision. Laboratory replicates are used to indicate precision. Laboratory replicates are aliquots made in the laboratory of the same sample and each aliquot is treated the same throughout the analytical method. The percent difference between the values of the replicates, as calculated below, is taken as a measure of the precision of the analytical method.

$$RPD = \frac{2 \times (D_1 - D_2) \times 100}{(D_1 + D_2)}$$

Where:

RPD = relative percent difference

D_1 = first aliquot value

D_2 = second aliquot (replicate) value

If the precision values for the laboratory replicate are outside the laboratory tolerance limit, the laboratory should recheck the calculations and/or identify the problem. Reanalysis may be required. If the precision values for either the laboratory replicate or field duplicate are outside the tolerance limit, sample results associated with the out-of-control precision results may be qualified at the time of validation.

As part of the data quality assurance review, some analytical results may be assigned a standard letter code by the laboratory or the reviewer to qualify the datum. For example, a qualifier may be assigned to a result to indicate that the reported chemical concentration is an estimate. A data quality review and analytical reports for the stormwater samples will be included in interim stormwater line solids and stormwater sampling reports (see Section 6.7).

6.7 Reporting

Because it may take several months to complete the stormwater evaluation, DEQ has requested that Hampton submit interim reports for each sampling event. Reports will be submitted within 30 days of receipt of the quality assurance reviews of the analytical results.

The interim solids and stormwater sampling reports will contain the following elements:

- Discussion of sampling activities and any deviations from the sampling plan.
- Field documentation (e.g. field notes and photos).
- A rainfall distribution graph for each storm event for the timeframe that begins 24 hours prior to the storm event, with an indication of when sampling took place.

- Copies of original laboratory reports and chain-of-custody documentation.
- Data summaries in both electronic and hard copy formats, using the data summary and screening tables provided in Appendix D of the DEQ's Stormwater Guidance (DEQ, 2010). The tables will clearly identify the sampling location(s), unit of measurement, compounds detected, laboratory method reporting and method detection limits, and SLVs. Detected compounds will be shown in bold text and compounds exceeding SLVs will be shaded for easy reference.
- Discussion of compounds detected, compounds detected above the SLV and the magnitude of SLV exceedance.
- Discussion of the contaminant concentrations using the charts provided in Appendix E of the DEQ's Stormwater Guidance.

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TABLES

Table 1
Proposed Catch Basin Solids Sampling and Analyses
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

	JSCS Screening Level Value	Analytical Method	Detection Limit
Units			
Metals/Inorganics	**milligrams per kilogram**		**milligrams per kilogram**
Arsenic	7	USEPA Method 6010A	2
Cadmium	1	USEPA Method 6020A	0.01
Chromium	111	USEPA Method 6020A	0.1
Copper	149	USEPA Method 6020A	0.05
Manganese	1,100	USEPA Method 6020A	0.05
Mercury	0.07	USEPA Method 7471B	0.0167
Silver	5	USEPA Method 6010A	2
Zinc	459	USEPA Method 6020A	1
PCBs Aroclors	**micrograms per kilogram**	**USEPA Method 8082**	**micrograms per kilogram**
Aroclor 1016	530		0.33
Aroclor 1221	N/A		0.33
Aroclor 1232	N/A		0.33
Aroclor 1242	N/A		0.33
Aroclor 1248	1500		0.33
Aroclor 1254	300		0.33
Aroclor 1260	200		0.33
Aroclor 1262	N/A		0.33
Aroclor 1268	N/A		0.33
Total PCBs	0.39		0.33
Semivolatile Organic Compounds			
Halogenated Compounds	**micrograms per kilogram**	**USEPA Method 8270D**	
Hexachlorobenzene	19		
Polycyclic Aromatic Hydrocarbons	**micrograms per kilogram**	**USEPA Method 8270 PAH SIM**	**micrograms per kilogram**
Naphthalene	561		6.67
2-Methylnaphthalene	200		6.67
Acenaphthylene	200		6.67
Acenaphthene	300		6.67
Fluorene	536		6.67
Phenanthrene	1170		6.67
Anthracene	845		6.67
Fluoranthene	2230		6.67
Pyrene	1250		6.67
Benzo(a)anthracene	1050		6.67
Chrysene	1290		6.67
Benzo(b)fluoranthene	N/A		6.67
Benzo(k)fluoranthene	13000		6.67
Benzo(a)pyrene	1450		6.67
Indeno(1,2,3-cd)pyrene	100		6.67
Dibenz(a,h)anthracene	1300		6.67
Benzo(g,h,i)perylene	300		6.67
Phthalates		**USEPA Method 8270**	**micrograms per kilogram**
bis(2-ethylhexyl)phthalate	330		33.3
butylbenzylphthalate	N/A		33.3
diethylphthalate	600		33.3
dimethylphthalate	N/A		33.3
di-n-butylphthalate	60		33.3

Table 1
Proposed Catch Basin Solids Sampling and Analyses
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

	JSCS Screening Level Value	Analytical Method	Detection Limit
Units			
Organochlorine Pesticides	**micrograms per kilogram**	**USEPA Method 8081**	**micrograms per kilogram**
4,4'-DDD	0.33		0.3333
4,4'-DDE	0.33		0.3333
4,4'-DDT	0.33		0.3333
Aldrin	40		0.3333
alpha-BHC	N/A		0.3333
alpha-Chlordane	N/A		0.3333
beta-BHC	N/A		0.3333
Chlordane	0.37		6.66667
delta-BHC	N/A		0.3333
Dieldrin	0.0081		0.3333
Endosulfan I	N/A		0.3333
Endosulfan II	N/A		0.3333
Endosulfan Sulfate	N/A		0.3333
Endrin	207		0.3333
Endrin Aldehyde	N/A		0.3333
Endrin Ketone	N/A		0.3333
gamma-BHC (Lindane)	4.99		0.3333
gamma-Chlordane	N/A		0.3333
Heptachlor	10		0.3333
Heptachlor epoxide	16		0.3333
Methoxychlor	N/A		0.3333
Toxaphene	N/A		6.66667
Other Analytes			
Grain Size	N/A	ASTM D422	N/A
Total Organic Carbon	N/A	Standard Method 9056	10

Notes

N/A = Not available

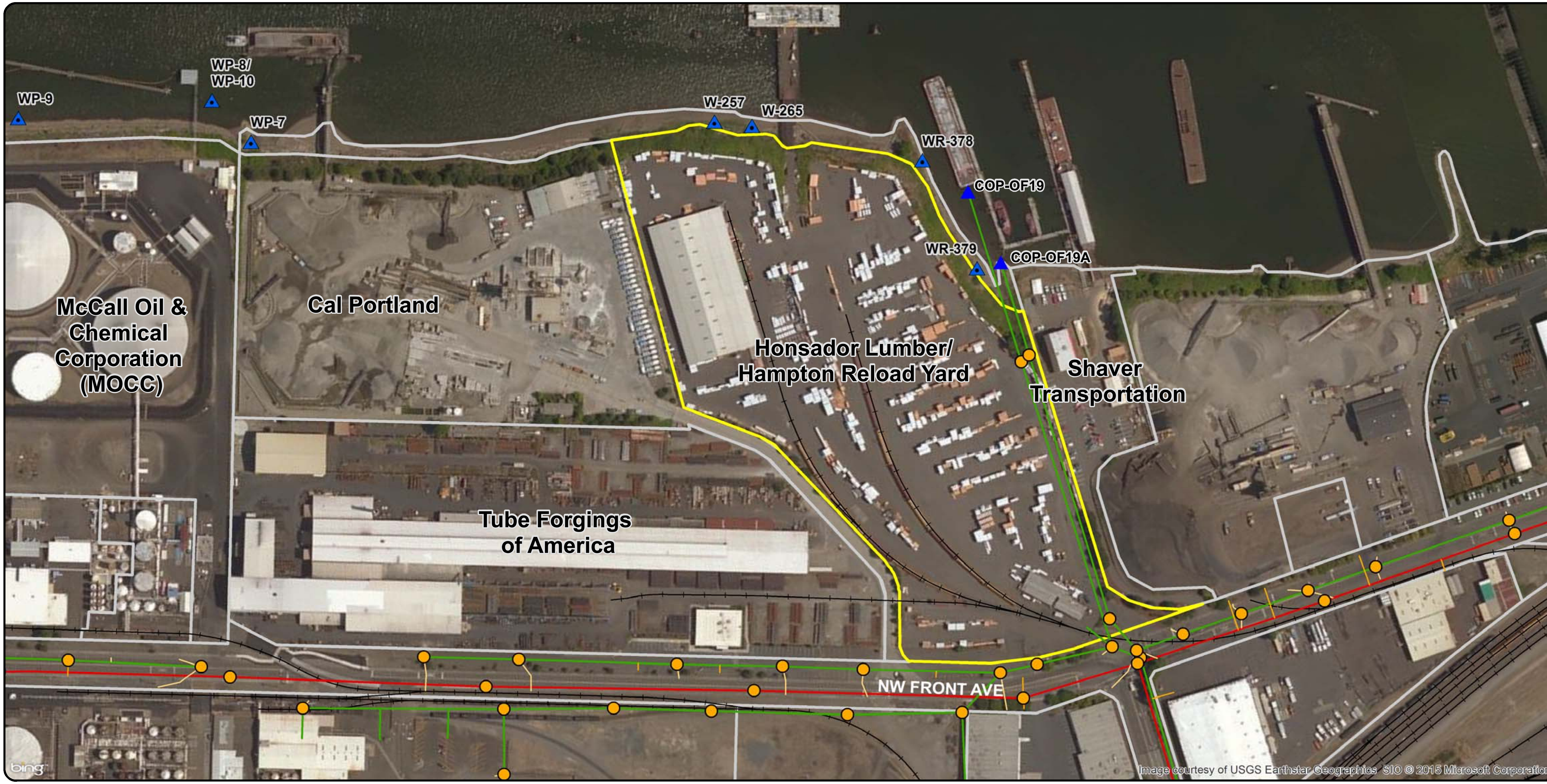
Table 2
Proposed Stormwater Sampling Locations, Schedule and Analyses
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

Sample Name	Sample Location	Drainage Area	2015-2016 First Flush Event (within 30 minutes of stormwater discharge)	2015-2016 Three Hour Event (flow within three hours of stormwater discharge)	Metals/Inorganics	PCBs Aroclors	Semivolatile Organic Compounds			Organochlorine Pesticides	Total Suspended Solids
							Halogenated Compounds	Polycyclic Aromatic Hydrocarbons	Phthalates		
SP-1	CB-6	1	2	2	X	X	X	X	X	X	X
SP-2	WR-265	3	2	2	X	X	X	X	X	X	X
SP-3	WR-257	4	2	2	X	X	X	X	X	X	X

Table 3
Proposed Stormwater Sampling and Analyses
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

	DEQ-USEPA Screening Level Value	Analytical Method	Detection Limit
Units	**micrograms per liter**		**micrograms per liter**
Metals/Inorganics			
Aluminum	50 -200	USEPA Method 6020A	10
Arsenic	0.045	USEPA Method 6020A	0.1
Cadmium	0.094	USEPA Method 6020A	0.1
Chromium	100	USEPA Method 6020A	0.1
Copper	2.7	USEPA Method 6020A	0.5
Manganese	50	USEPA Method 6020A	0.5
Mercury	0.77	USEPA Method 7471B	0.1
Silver	0.12	USEPA Method 6020A	0.1
Zinc	36	USEPA Method 6020A	2
PCBs Aroclors			
Aroclor 1016	0.96	USEPA Method 8082	0.019
Aroclor 1221	0.034	USEPA Method 8082	0.019
Aroclor 1232	0.034	USEPA Method 8082	0.019
Aroclor 1242	0.034	USEPA Method 8082	0.019
Aroclor 1248	0.034	USEPA Method 8082	0.019
Aroclor 1254	0.033	USEPA Method 8082	0.019
Aroclor 1260	0.034	USEPA Method	0.019
Aroclor 1262	N/A	USEPA Method 8082	0.019
Aroclor 1268	N/A	USEPA Method 8082	0.019
Total PCBs	0.000064	USEPA Method 8082	0.019
Semivolatile Organic Compounds			
Halogenated Compounds	**micrograms per liter**	**USEPA Method 8270D**	
Hexachlorobenzene	0.00029		1
Polycyclic Aromatic Hydrocarbons	**micrograms per liter**	**USEPA Method 8270 PAH SIM**	**micrograms per liter**
Naphthalene	0.2		0.05
2-Methylnaphthalene	0.2		0.02
Acenaphthylene	0.2		0.02
Acenaphthene	0.2		0.02
Fluorene	0.2		0.02
Phenanthrene	0.2		0.02
Anthracene	0.2		0.02
Fluoranthene	0.2		0.02
Pyrene	0.2		0.02
Benzo(a)anthracene	0.018		0.02
Chrysene	0.018		0.02
Benzo(b)fluoranthene	0.018		0.02
Benzo(k)fluoranthene	0.018		0.02
Benzo(a)pyrene	0.018		0.02
Indeno(1,2,3-cd)pyrene	0.018		0.02
Dibenz(a,h)anthracene	0.018		0.02
Benzo(g,h,i)perylene	0.2		0.02
Phthalates		**USEPA Method 8270**	**micrograms per liter**
bis(2-ethylhexyl)phthalate	2.2		1
butylbenzylphthalate	3		1
diethylphthalate	3		1
dimethylphthalate	3		1
di-n-butylphthalate	3		1
Organochlorine Pesticides	**micrograms per liter**	**USEPA Method 8081**	**micrograms per liter**
4,4'-DDD	0.00031		0.00985
4,4'-DDE	0.00022		0.00985
4,4'-DDT	0.00022		0.00985
Aldrin	0.00005		0.00985
alpha-BHC	0.0049		0.00985
alpha-Chlordane	N/A		0.00985
beta-BHC	0.017		0.00985
Chlordane	0.00081		0.197
delta-BHC	0.037		0.00985
Dieldrin	0.000054		0.00985
Endosulfan I	0.051		0.00985
Endosulfan II	0.051		0.00985
Endosulfan Sulfate	89		0.00985
Endrin	0.036		0.00985
Endrin Aldehyde	N/A		0.00985
Endrin Ketone	N/A		0.00985
gamma-BHC (Lindane)	0.052		0.00985
gamma-Chlordane	N/A		0.00985
Heptachlor	0.000079		0.00985
Heptachlor epoxide	0.000039		0.00985
Methoxychlor	0.03		0.00985
Toxaphene	0.0002		0.197
Other Analytes			
Total Suspended Solids	--	M2450 D	5.00

FIGURES



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Print Date: 6/11/2015

Project:1001/HA-005

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Source:Tax lot data obtained from City of Portland, Corporate GIS (Portland Maps); Sanitary/Storm System obtained from City of Portland BES; Aerial photograph obtained from ESRI, ArcGIS Online/bing.

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BRIDGEWATER GROUP, INC.

Legend

- Outfall
- Manhole (City of Portland)
- Outfall (City of Portland)
- Inlets
- Laterals
- Sewer Pipes
- Storm Pipes
- Railroad
- Site
- Taxlots

Figure1
Site and Vicinity

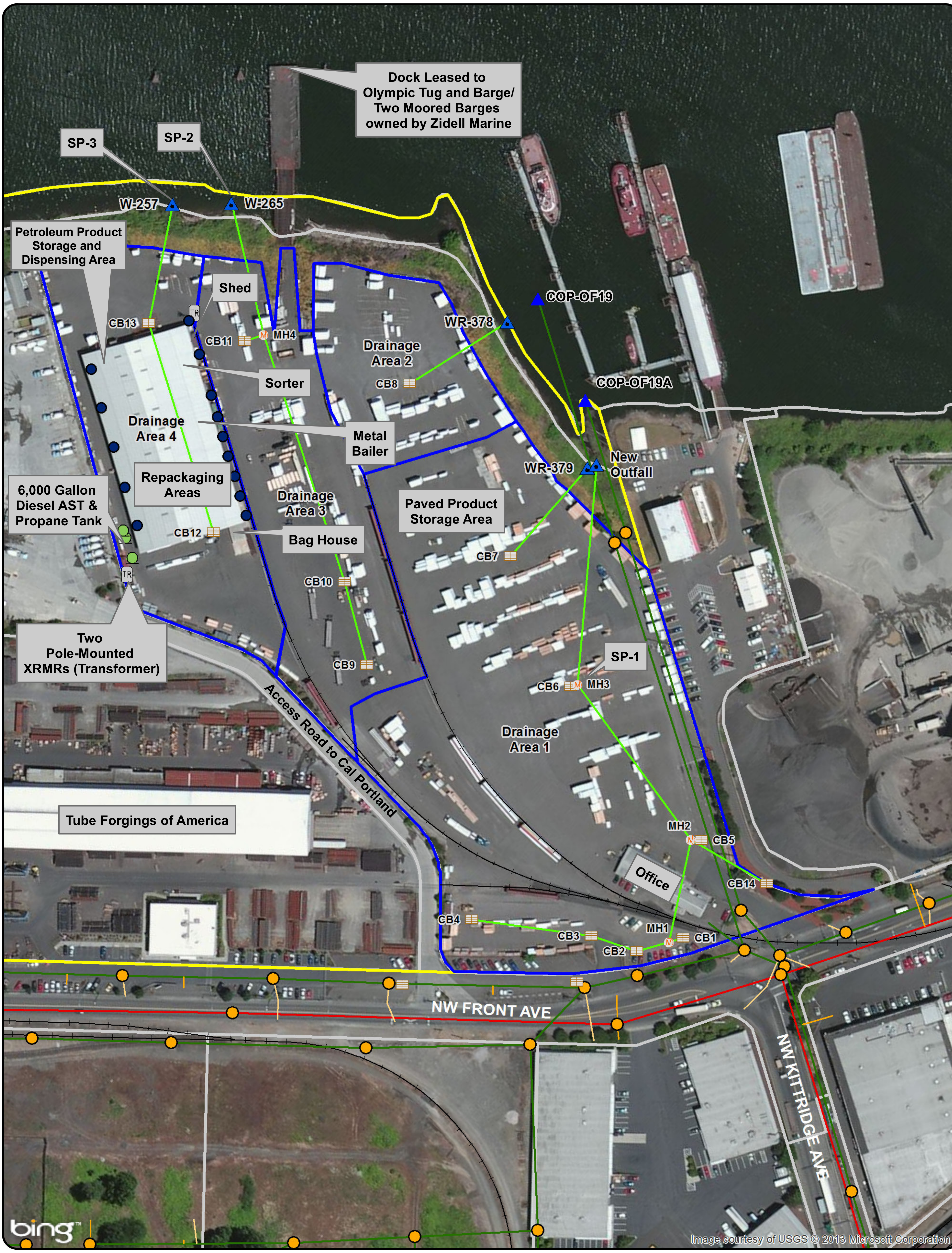
Hampton Reload Yard
4950 NW Front Avenue
Portland, Oregon

0 150 300
Feet

Path: E:\KAZGIS\Project\1001-Bridgewater\HAI-005\Figure2_Site Layout.mxd

Print Date: 5/16/2013

Project:1001/HAI-005



Source: Onsite feature locations are approximate; Tax lot data obtained from City of Portland, Corporate GIS (Portland Maps); Railroad data obtained from Metro Data Resource Center (RLIS); Sanitary/Storm System obtained from City of Portland BES; Onsite Storm System features obtained with Trimble GeoXH 6000 Series GPS unit; Aerial photograph obtained from ESRI, ArcGIS Online/bing.

Legend

- Downspout
- Manhole
- AST
- Transformer
- Outfall
- Catchbasin
- Manhole (City of Portland)
- Outfall (City of Portland)
- SP-1 = Sample Point
- On-Site Stormwater Line
- Inlet (City of Portland)
- Lateral (City of Portland)
- Sewer Main (City of Portland)
- Storm Main (City of Portland)
- Railroad
- Drainage Basin
- Site
- Tax Lot

Figure 2
Site Layout

Honsador Lumber / Hampton Reload Yard
4950 NW Front Ave.
Portland, Oregon

0 100 200
Feet

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